DEFENSIBLE SPACE

PROPOSED GUIDELINES

Background:

Since the mid-1960s, and particularly in the last ten to fifteen years, more and more people have subdivided and developed areas adjacent to public wildlands for residential, recreational and commercial uses. The result of this development has been the creation of communities and suburban areas mixed with or in close proximity to wildland vegetation. A term commonly used by Fire Protection Specialists to refer to such areas is the "Wildland/Residential Interface" (WRI) or "Wildland/Urban Interface" (WUI).

Faced with limited assets with which to fight wildland fires and protect homes from their devastating effects, the practices of uninformed developers and homeowners can greatly exacerbate potential hazards and lead to unnecessary losses from wildfires in the WRI. At the same time, the exercising of thoughtful preparatory actions can greatly improve the chances of survival of the homes while significantly reducing the risks that confront firefighters. People who choose to live in or near the scenic wildlands have the responsibility to take necessary precautions when facing predictable hazards such as forest and range fires. It is in the interest of all concerned, then, the owners and potential owners of homes in the wildland/residential interface, members of emergency management agencies and the public at large, both collectively and individually, to do their utmost to prevent and mitigate the effect of such disasters. To that end, there is a wealth of information available on various internet websites related to fire protection. Two excellent ones are www.firewise.org and www.keepgreen.org., which contain both general and more highly detailed information for all facets of the problem of wildland fire protection.

The guidelines set forth herein are in conformance with those recommended by both the Montana Department of State Lands and the State Fire Marshal. Due to the diverse nature of the terrain, vegetation and weather of Madison County, it is important that the guidelines be applied with flexibility and in consultation with fire experts. In some cases, certain trade-offs may be possible. For example, residential sprinklers might compensate for reduced driveway width or a wide road with numerous turnouts might suffice rather than a separate road for access and egress where terrain considerations make the latter prohibitively expensive. Although the goal must be protection of life, property and resources, there could well be several alternatives to achieve that end.

Esthetics:

People who choose to live in scenic wildlands have the responsibility for taking necessary precautions when facing predictable hazards. The landowner's role in fire protection does not, however, preclude consideration of the very ambiance which attracted his or her attention to the land in the first place. The intent of these guidelines is risk reduction with attendant increase in ability to protect developed infrastructure against a foreseeable and perhaps even inevitable problem. Such activity need not always result in adverse impact on the charm and natural beauty of an area. It may even enhance it. But in the final analysis, the degree to which risk reduction is to be implemented and at what cost to ambiance and esthetics is a decision in which the individual and the community must jointly participate, fully aware of the trade-offs being undertaken.

Guidelines for New Development

Access:

All developments should have more than one ingress-egress route and employ looped road networks. The sub-divider should provide access to all open space within the subdivision, as well as to areas intended for

structures. Routes and road widths should be adequate for simultaneous access of emergency vehicles and the evacuation of residents. Such a road would typically consist of at least two 12 foot driving lanes for primary roads and two 10 ft lanes for secondary roads; two 8 ft. wide zones clear of vegetation adjacent to the driving surface; and two 10 foot wide zones of reduced vegetation beyond that. Consideration must be made for the increased turning radius and limited maneuverability of long wheelbase tankers and other fire vehicles and means provided, particularly, when cul-de-sacs and long private driveways are intended, to preclude entrapment of vehicles in case of advancing fire. In general, road grades of less than 10% are desirable and in no case should grades exceed 15%. Avoid sharp changes in grade. All roads and approaches should be designed to accommodate 80,000 lb, two axle loads. A straight section of road should extend for 80 ft. from any intersection.

The unobstructed all weather surfaces of all driveways should be at least 12 ft. wide. A 16 foot width is preferable for driveways over 600 ft. long. Both roadways should have a 4 foot zone of reduced vegetation on each side of the driving surface. Vertical clearance should exceed 15 ft. at all points of access. If looped roads and driveways are not specified, a turnaround of at least a 60 ft. radius located within 50 ft. of each building (150 feet is there is a community water system) should be provided. Driveways over 400 ft long should provide a turnout area 10 ft wide by 30 ft long every 300 ft. to allow vehicles to pass. Water hauling tenders are heavy (some in excess of 80,000 lbs.). Bridges and culverts should be made to accommodate such loads and should carry signs with ratings of the structures.

Water Supply:

Developments should provide one of the following fire protection packages:

1. Fire protection water supply system capable of 1,000gallons per minute at 20 psi minimum through approved fire hydrants for a minimum of 120 minutes. The maximum distance from a lot line furthest from a hydrant should not exceed 1,000 feet.
2. Fire protection water tank(s) of a minimum of 30,000gallons with a pump capable of delivering 1,000 gpm at 20 psi from any hydrant. Maximum distance from the furthest lot line to a hydrant should not exceed 1,000 feet.
3. Installation in every residential or combination use structure a fire protection sprinkler system compliant with NFPA standards, together with appropriate system capable of 1000 gpm/20 psi/120 minute at the site.

Commercial structures should be provided with fire detection and fire protection sprinkler systems compliant with NFPA standards.
Separation between structures, including accessory buildings, protected by approved fire sprinkler systems and all non-sprinkler protected structures should be a minimum of 50 ft.

Back-up power required for water distribution systems supplying fire hydrants or fire sprinkler systems and/or a source of back-up power for wells or pumps associated with such systems should be included as part of the overall system.

Maps and Signage:

Address signs should be posted at the entrance(s) to each lot between 4 and 8 feet above the ground. Numbers and lettering should be at least four inches minimum height and of sufficient contrast to be readily read from the adjacent access road. Reflective material or other provision for night visibility is preferred. Use of non-combustible material is recommended.

Street signs to conform to county standards should be installed before any approved lots are offered for sale. Such signs should be of non-combustible material and located approximately 8 feet above the ground, well

clear of obstructing vegetation or other visual interference. Personnel in emergency vehicles need to be able to read such signs from at least 100 feet.

An appropriate sign denoting the name of the development should be provided at all entrances to the subdivision, to remain at least until all lots are sold. Ideally, such a sign would also provide information as to fire danger and fire prevention. Fire prevention signs throughout the subdivision would do much to further public and homeowner awareness.

A map of the subdivision should be provided to the appropriate fire protection authority and the Madison County Fire Marshal, indicating streets, addresses, street names, fire protection features, lot lines, build able area envelopes, utilities, easements, etc.

Landscaping:

Trees, brush and dense undergrowth are primary fire hazards. Consideration of local area fire history, prevailing winds and weather patterns, property contours and overall environment are vital in planning any development. Fuel breaks and greenbelts within and around the perimeter of the subdivision, to separate communities, groups of structures or individual homes, and intended too slow or stop the spread of an oncoming fire should be an inherent part of subdivision design. Similarly, employment of fire resistant vegetation can greatly enhance the defensible nature of a development and its component parts.

Fuel breaks generally consist of a minimum 24 foot wide strip of diced or plowed ground or mowed vegetation and may include a developed walking or riding trail system if the trails are of non-combustible construction. Fuel breaks must be maintained at least twice each year to be effective. Such breaks can be incorporated into a 100 to 300 foot wide area surrounding the development in which fuel removal and mitigation are combined with other methods of breaking fuel continuity protect both existing and planned developments and the adjacent wildlands. The perimeter fire protective area should conform as closely as possible to the boundary of the development.

Another recommended effective means of providing fire protection is the use of open spaces and public use areas, such as parks, recreation sites, picnic areas and perimeter roads to break fuel continuity. Natural features such as rocky formations, river or streambeds and similar areas in which vegetation has been thinned and dead and dying materials removed can also be an effective part of the overall subdivision landscaping plan to help retard an advancing wildfire. The subdivider should provide a vegetation management plan to the homeowners association or other entity to be charged with responsibility the common spaces and open areas. Provision should be made for management of sold lots which have not been built upon.

Reduction of flammable vegetation and other hazards around all buildings provides a “defensible space” for firefighters and residents, greatly improving chances of protecting the structure in case of wildfire. Such a defensible space is frequently the primary factor in arriving at decisions related to of risking firefighting assets in the face of wildland fires. Defensible space begins with an inner area within thirty feet of the building in which no conifer or high oil content or non-fire resistant tree or shrub is allowed to encroach. The ground cover in this area should be non-combustible or irrigated, mown lawn. Progressively less restrictive measures are employed out to 150 to 200 feet from the structure. Developers should provide new owners with lists of fire resistant vegetation suitable to the area. See Defensible Space guidelines for individual homeowners as well as the guidelines for existing homes and homeowner associations.

Construction Standards:

In designing and building structures within the WRI, the primary goals re fuel and exposure reduction. Use of fire-resistant or non-combustible materials whenever possible is an inherent part of such construction planning. The following practices, while less than totally definitive, greatly enhance the defendability and survivability in the face of wildland fires.

- **Roof Construction:** Roofs should have a Class A roof covering and/or a Class A roof assembly. Roof coverings wherein the profile allows a space between roof covering and roof decking, the eave ends should be fire stopped to preclude entry of flames and embers. A fire-resistant sub-roof is recommended for added protection. Eaves and soffits should use materials approved for a minimum of one-hour-rated fire resistant construction on exposed surfaces. Fascias should be installed and should be protected on the backside by similar fire resistant materials.
- **Exterior Walls**: Exterior walls should be constructed of materials approved for a minimum of one-hour-rated fire-resistant construction on the exterior or constructed with noncombustible material. Heavy timber or log homes should have such material extending from the top of the foundation to the underside of the roof sheathing. Vinyl is not considered advisable because it will soften and melt. All under floor areas should be enclosed to the ground.
- Windows and Doors; Exterior windows, window walls and skylights should be tempered glass or multi-layered glazed panels. Smaller panes hold up better in the face of fire than larger areas of glass and should be considered. Non-flammable shutters for windows and skylights should be considered for additional protection. Exterior doors, other than vehicular access doors, should be noncombustible or solid core at least 1" thick. At least two ground level doors should be provided for safe and easy exit and at least two means of escape (windows or doors) should be provided in each room.
- **Vents**: Vents should not exceed 144 sq. inches each. All vents should be covered with noncombustible corrosion-resistant mesh with openings no larger than 1/8 inch. Locations of vents should minimize opportunity for entry by embers.
- **Accessory Structures**: Wood fences, trellises and other accessory structures should use masonry or metal as a protective barrier between that structure and the house. Consideration of the use of metal for trellises and garden structures should be considered. Elevated decks, particularly at the top of a hill or over a descending slope greater than 10%, should be enclosed and made of fire-resistant material or terracing used instead.
- **Structure Access**: Each new and existing structure should have installed a lock box to hold labeled keys to the exterior and interior doors. Lock box make, model, location and access instructions should be provided to the County Fire Marshal. The lock box should also provide local contact information to be used in case of fire alarms or approaching wildfire.

Siting:

Buildings, including mobile homes, should be at least 60 feet apart and at least 30 feet from the property line.

The most level portion of the land is most suitable for building from a fire protection point of view since fire spreads more rapidly on even minor slopes. Consideration should be made in siting to slope of the terrain. Structures should not be built in forest fuel areas where the slope is greater than 30%, at a canyon mouth, in a ridge saddle or in other areas of extreme fire hazard. On terrain of less than 30% slope, lot sizes should increase with increasing slope in order to allow homeowners to properly manage vegetation as outlined elsewhere in these guidelines.

Single story structures should be set at least 30 feet back from any ridge or cliff. That distance should be increased for homes higher than one story.

Utilities:

Most fires resulting from electrical lines seem to be caused by distribution lines as contrasted to transmission lines, however either can by the source of wildland fire risk. In general, provision should be made for inspection all electrical transmission or distribution lines prior to the beginning of fire season each year and correction of any fire hazards or risks which may be found.

Distribution lines should be placed underground whenever practical. For above ground lines, provision for inspection and management should be made, including the vegetation in rights of way. Transmission lines of 34.5 kilovolts and greater cannot be placed underground, therefore rights of way must be kept free of fire hazards.

Guidelines for Existing Dwellings and Homeowner Associations

General:

Homeowners and Homeowner Associations should use all three sections of these guidelines on a continuing basis to guide maintenance and improvement planning and execution. Consultation with local fire authorities and the county emergency management department should be an integral part of that process. A close working relationship should be developed between the fire protection professionals and those having an equity interest in the property. Associates or other neighborhood groups should form a fire protection or similar committee to oversee wildfire hazard reduction projects, make risk reduction recommendations and work to maintain a close relationship with emergency management agencies. Provisions should also be made for maintenance and improvement of fire protection related measures already in place.

Creation of a Defensible Space:

Trees, shrubs, brush and other dense growth can ignite readily, burn with intense heat and promote rapid spread of fire. Vegetation should be managed so as to reduce exposure of structures to flames and radiant heat during a wildfire. Reduction of flammable vegetation and similar hazards around buildings provides a "defensible space" for firefighters and residents. Through development of a team concept between owners and trained fire protection people the potential for wildfire survivability of structures, people and equipment in the WRI can be greatly enhanced.

All structures, new and existing, habitable or not, should have a perimeter of non-combustible material beginning at the edge of the structure and projecting outward for at least 5 ft. This area could include vegetation free dirt, gravel, rocks, concrete or similar material. No vegetation or any plant material, as well as wooden decks or walkways should be permitted within this zone. Wood piles or any combustible litter should not be found in this area either.

Conifers, high oil content vegetation and non-fire resistant trees or shrubs should not be permitted to encroach within 30 ft. of any structure. Ground cover out to a distance of 60 ft from any building should be non-combustible or irrigated, mowed lawn. Conifers and other more highly flammable vegetation should be sufficiently spaced to reduce propensity for fire to transit from one to another and ladder fuels should routinely be reduced to a distance of 150 to 200 feet from structures.

Initially the developer, and later, the property owners' association should prepare a list of recommended fire resistive trees and shrubs which are adaptive to the area. All vegetation within 60 ft of any structure, including but not limited to trees and shrubs, should be fire resistive. Detailed guidance as to application of these and other portions of these general guidelines may be obtained for individual sites from fire professionals.

Similar principles should be applied to the overall perimeter of the area under control of home owners associations. See also the guidelines for new developments, many of the provisions of which can be back-fitted to developments after they have been sold out.

Guidelines for New Homes

General:

Careful perusal of the previous two sets of guidelines will result in many principals and detailed techniques applicable to individual new homes, the majority of which are much easier and more cost effective to deal with prior to and during construction than to implement later in the life of the home. Such considerations should be discussed with lenders and insurers early on in order to explore alternatives and include them in construction planning and financing as appropriate. In addition, pre-construction discussion of siting, water supply, accessibility, local fire considerations and history and the like with the applicable fire protection agency could result in greatly enhanced survivability for the home under consideration as would ensure familiarity of the emergency responders with the resulting structure and any special needs of its inhabitants once construction has been substantially completed.

Installation of a fire protective sprinkler system, engineered for that building, should be included in every residential and combination use structure. In addition, all structures should be provided fire and smoke detection and warning systems.

One Lot Minor Residential Subdivisions:

An underground tank of 10,000 gallon capacity with a capability of delivering 20 psi to a hydrant within 1000 feet of the furthest lot line would be highly desirable. As a minimum, dry hydrants with an equivalent water source and capacity potential should be provided after consultation with the local fire jurisdiction.